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ABSTRACT

This study seeks to observe and record the impact of the Internet as an educational tool on fifth grade students' (N=95) attitudes towards and behavior while interacting with this technology. The students attend a rural elementary school that is part of a study to implement a community-based, technology-enhanced, integrated curriculum. Working in pairs in a computer lab, students answered questions on worksheets pertaining to each web site they explored on a guided tour. Observation of student behavior was conducted using field notes and a video camera. Analysis indicates that students appear to become increasingly stimulated as they progress through the exploration. Students also completed a survey at the end of the school year that measures attitudes toward the activity. Results indicate that regardless of the students' level of experience, no signs of intimidation by the technology are observed and some students seem further empowered to use the technology. (Author/DDR)

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# A Case Study of Attitudinal Effects of Internet Use in a Middle School Integrated Science Curriculum

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## Abstract

The purpose of this study was to observe and record the impact of the internet as an educational tool on 95 fifth grade students' attitudes towards, and behavior while interacting with this technology. These students came from a rural elementary school that is part of a study to implement a community-based, technology enhanced, integrated curriculum. Over a period of five weeks each group of students made one trip to the computer lab at the University of California at Davis. During a two-hour session the students were lead on a guided exploration of web sites, including those from their community and natural environment. Working in pairs, the students answered questions on worksheets, pertaining to each site, as they visited the sites. Observation of student behavior was conducted using video camera and field notes. Analysis indicates that students appeared to become increasingly stimulated as they progressed through the exploration. Students also completed an end-of-year technology survey that measured their attitude towards this activity, and that asked students to discuss what the activity involved. Regardless of the students' level of experience no signs of intimidation by the technology were observed. Indeed, interaction with the internet seemed to empower students to further utilize the technology.


## Introduction and Setting

The primary purpose of this study was to investigate the impact of the internet as an educational tool on fifth grade students' attitudes toward, and behavior while interacting with this technology. The students come from a rural elementary school which is part of a study to implement a community based, technology enhanced, integrated, curriculum. The study is referred to as *Project CREEK: Community Resources Through Environmental Education for Kids*--a collaborative project between the University of Maryland, University of California Davis and this elementary school. The community in which the school is located is relatively small, agricultural, working class, and forty percent Latino. Two-way immersion as well as bilingual classes are offered to students in grades K-4. Fifth grade is predominantly a transition year for Spanish speaking students.

One component of this curriculum reform was the introduction of the internet to the students. Most students in our study had no prior experience with computers or the internet. Even those students who did have knowledge of what the internet was did not have access to it very often. This information was revealed in technology surveys given at the beginning of the year. We proposed that a study of the impact of the internet on students' attitudes toward technology and behavior interacting with technology might provide valuable data on curriculum reform. It was hypothesized that interacting with the internet would have a strong impact on students from a rural school, allowing them to interact with environments other than their own. In a way the internet has the effect of taking a rural school out of "isolation" and into other communities around the world. This study was also expected to provide valuable data on the support necessary for students to successfully navigate the World Wide Web, and some of the factors contributing to this. It was also expected that the Latino students might experience some language related difficulties during this internet activity.

## Theoretical Background

John Dewey noted that when people learn about a tool they learn what it is and when and how to use it. When people learn new information in the context of meaningful activities they are more likely to perceive the new information as a tool rather than as an arbitrary set of procedures and facts, (Dewey, 1933). Indeed many studies have shown the positive effect of learning in meaningful, socially organized contexts on student achievement and attitudes, (Bransford, 1983; Sherwood, 1987; Vanderbilt, 1990)

Interactive multimedia allows students to learn in many different ways. In particular use of the internet provides students with access to real world, real time experiences and has the ability to incorporate their own environment into this experience, (Boone, 1997).The internet has also been shown to foster cultural literacy in students (Cummins & Sayers, 1995).

When considering integrating the internet into instruction it is necessary to establish factors that contribute to making this implementation successful. In a study investigating the use of the World Wide Web for On-line inquiry, Lyons et al discuss the supports necessary to facilitate On-line inquiry amongst 6th grade and 9th grade students. They found that "students need support in basic skills such as the planning process and the basic mechanics of searching in an environment such as the World Wide Web."(Lyons, Hoffman, Krajcik, & Soloway, 1997). Kedar et al state: "Because pedagogical issues can have a tremendous impact on the success or failure of any new technological innovation it is necessary to really look closely at how the use of the World Wide Web classroom is affected by how it is implemented by teachers and used by students"(Kedar et al., 1996).

## Methodology

Over the period of five weeks 95 fifth grade children came to the computer lab at University of California at Davis one time. During a two hour session the students were lead on a guided exploration of web sites. The students first visited a web site from their own region and then looked up their residential address on an interactive map of their home town. Next they conducted their own search for information on a neighboring

creek. Working in pairs the students answered questions on worksheets, pertaining to each site, as they visited the sites. After completing this guided exploration the students chose from a selection of additional sites to explore. Finally before the students left they were shown their own school site where they saw pictures of their teachers and of the "integrated curriculum project" activities.

Observation of student behavior ,while interacting with the computer, was conducted using video camera and field notes. Students also completed a post school year technology survey which was administered on a one-to-one basis by a consistent team of researchers. This survey consisted of ten items measured on a Likert scale, which served to measure attitudes toward computers, as well as questions which ascertained whether students had a computer at home or access to a computer else where. The survey additionally asked questions about the students experience in the computer lab and their prior experience with the internet.

## Qualitative Data Analysis and Discussion

Analysis of the video tapes and field notes showed that students exhibited increased stimulation as they progressed through the exploration. Possibly this is due to the order in which the web sites were visited. Visiting their own environment first and then progressing to other sites such as the White House gave the students an idea of how expansive the internet is and how many different types of information are available on the web as well as demonstrating how their "world" is also a part of this. Seeing their environment as part of this expansive network which contains information about places

all over the world was very exciting for them. Also I think that this gave the students a sense of how important their own environment is.

Regardless of the students' level of experience with computers, no signs of intimidation by the technology were observed. Indeed observations show that interaction with the internet seemed to empower students to further utilize the technology. This is contrary to the belief held by some educators that students with little computer experience will find technology enhanced instruction to be a frustrating experience. Students were very focused throughout this activity, and only seemed frustrated when their work was interrupted.. Within a short amount of time students seemed to be both competent and confident with navigating the World Wide Web.

## Quantitative Data Analysis and Discussion

An end-of-year technology survey, which was given to students three months after the activity, asked students to describe what they had done on the internet in the UC Davis lab. The responses to this question were coded according to which sites students remember having visited. Sites were assigned to one of five categories: An interactive map of their home town, their local Dam/Creek, the "integrated project" home page, animals, and the site they choose to visit. In addition a sixth category was added to include students remembering that they had been given a choice of sites to visit, during the exploration.. The proportions of responses per category were analyzed using a Chi-square test. This analysis showed that two categories were represented significantly more than others in the student responses: (1) finding their home address on the interactive

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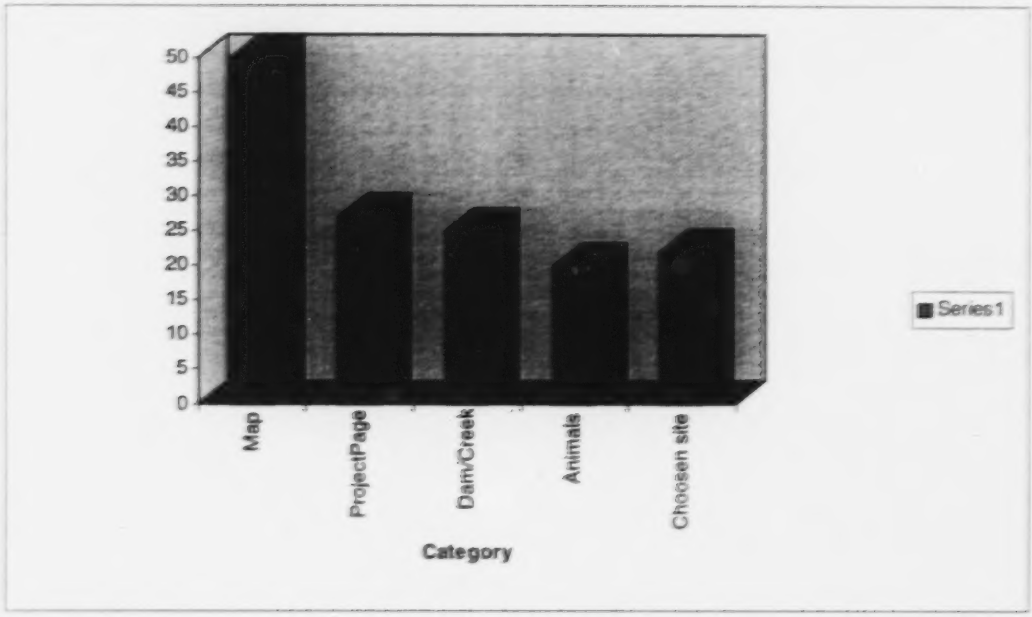
map, and (2) having a choice of sites to visit ($X^2(95, 5) = 29.239$, $p < .0001$, contingency coefficient = .39)




A 2(Gender: M,F) x 2(Ethnicity: L, C) X 2(Prior Internet Experience: Yes, No) between-subjects ANOVA was conducted with attitude toward this activity serving as the dependent variable. No significant main effects of gender or prior internet experience were observed. However, a significant main effect of Ethnicity was observed ($F(1,78) = 4.563$, $p = .0369$, effect size = 65%). No significant interactions were observed.

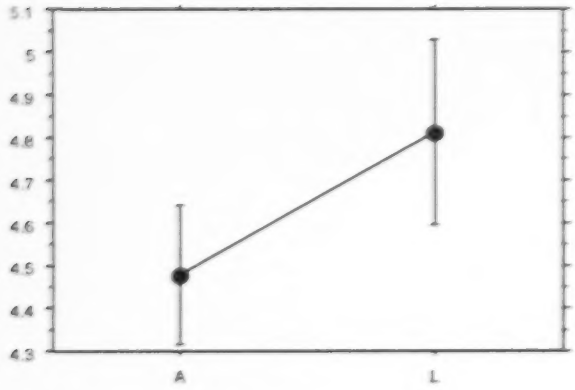
**Means and Standard Deviations for Activity Rating**

| | F,L | F,A | M,L | M,A |
|---|---|---|---|---|
| Count | 13 | 22 | 15 | 28 |
| Activity Rating | 4.833 (.408) | 4.500 (.514) | 4.800 (.422) | 4.464 (.576) |

**ANOVA Table**

| Source | df | F | Sig. |
|---|---|---|---|
| **Gender** | 1 | .049 | .828 |
| **Ethnicity** | 1 | 4.563 | .037S |
| **Internet Access** | 1 | 1.854 | .179 |
| **Gender x Ethnicity** | 1 | .0000 5778 | .994 |
| **Gender x Internet Access** | 1 | 1.879 | .174 |
| **Ethnicity x Internet access** | 1 | .735 | .389 |
| | | | |

**Interaction Line Plot for Ethnicity**




## Conclusions

Three overall themes were found in the data from this study. The first theme is that students appear to be stimulated when their learning is embedded in their own environment. This was evident from the students' behavior during this internet activity. Also, when asked six months later, what they had done that day a significant number of



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students remembered aspects of the scavenger hunt that pertained to their own environment. The Internet lends itself very well to lesson plans designed around students home environment. What is even more evident from this case study is that students were excited not only by seeing their environment on the computer, but seeing it as part of an expansive worldwide network. Whereas incorporating the student's environment into the curriculum is possible without using the internet, the juxtaposition of different environments is well suited to internet use.

The second theme found is that students enjoyed having a choice of sites during this activity. Many of the students commented on this choice. Also the analysis of themes showed that students utilized this choice (i.e., some of the students visited each site from the list of choices). The internet provides many choices for learning.

The third theme is that middle school students are not necessarily intimidated by the technology, regardless of prior experience with computers. These students worked on the computers without any inhibition, and were not at all intimidated. They were very focused on the activity, and proceeded through the sites with confidence. In addition the Latino students did not appear to have any language difficulties. These students rated this activity significantly higher than the Anglo students. Also, when asked if they had experienced any frustrations in the lab due language problems ninety seven percent of the Latino students reported no frustrations.

## Future Research

During the first year of this project there was a low use of computers at the school. However this year the students have intranet access in their school and are involved in

designing web pages. Next year they will be on the internet and technology use in the classrooms will increase. A pre and post test was administered this year and a 2(Gender: M,F)x2(Ethnicity:L,C) x2(Attitude Test: Pre, Post) between-within ANOVA showed a significant change in student attitude towards computers. Through year two and three this test instrument will be used to continue to measure changes in attitudes toward computers. It will be interesting to see if the change remains statistically significant. Given that most of the students related their computer experience with the time spent in the UC Davis lab, this significant change could be a novelty effect. In addition focus interview questions are being designed to identify factors which contribute to this change in attitude.

The effect of Ethnicity that was observed during this activity will also continue to be observed. Differences in attitudes toward computers between Latino and Anglo students will be observed. In addition video taping and on site observations will be conducted. Once again focus interview questions will be designed to identify contributing factors.

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